

Using Kepler to Study M dwarf Granulation and Detect Exoplanets around our Nearest Neighbors

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For years now, the exoplanet community has focused their efforts on the ultimate goal - the detection of an Earth-like planet in the habitable zone of a nearby star. In the next few years, multiple instruments on 8-10m class telescopes will be upgraded or commissioned from scratch to reach the ~ 1 m/s in the infrared RV measurement precision necessary to detect habitable Earth-mass planets around nearby M dwarfs. However, with this considerable effort and potential telescope time being placed on detecting such light-weight planets, it is critical that we invest some effort in learning as much as possible about the atmospheric characteristics of the planet host target stars - the M dwarfs. Indeed, there is still much to be learned about the interiors and atmospheres of the most populous star in the galaxy. There are still inconsistencies between measured radii and those predicted by stellar models. Also, we have much to learn about the interplay between the convective and magnetically driven processes that affect the light curves and RV measurements obtained for these popular planet search targets. Therefore, the goal of this K2 proposal is to utilize the ultra-precise photometry attainable with Kepler to study their granulation properties and to search for correlations between light curve properties and the RV jitter which prevents the detection of Earth-mass planets.